A NOTE ON POPULATION MOVEMENT IN *NYCTEMERA AMICA* (WHITE) (LEPIDOPTERA: ARCTIIDAE)

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The diurnal Cineraria moth [*Nyctemera amica* (White)] is fairly common in southern and eastern Australia. Population movements of this species have not, apparently, been recorded although Seitz (1890) mentions that it is sometimes seen off the Australian coast thus implying deliberate flights or wind borne displacement.

In early November, 1974, the Cineraria moth suddenly became extremely common in Sydney after a period during which only single specimens had been noted. On 10th November a strong, dense population movement was observed between the suburbs of Turramurra and Chatswood, the moths all moving steadily in a west-south-westerly direction. As many as thirty specimens were in view at once and at times the population was too dense for any kind of count to be possible.

Many reports of flights and large populations were received from observers cooperating in the Australian Museum's migration study project. These reports are summarized in Table I. An asterisk (*) indicates that large populations were noted. Directions are given when they were reported; when not it is to be assumed that numbers were seen on the dates indicated but that the population was not obviously moving as a whole in any particular direction.

In all 94 reports were received of exceptional numbers being seen. The earliest report was for 6th September 1974 (Tallarook-Albury) and the latest for January 1975 (Strathfield, Mordialloc). Of the reports which gave definite information of flight direction 41 were for November 1974 and 29 of these included at least part of the period 9th-12th November.

The general picture which emerges from the data presented in Table I is as follows. Numbers of *N. amica* were exceptionally high during the 1974-1975 season and large numbers were reported from mid-September 1974, especially in Queensland. By early November the areas from which large numbers were reported had increased and included the eastern part of the continent from southern Queensland, through New South Wales and Victoria, to South Australia. The observations of definite population movement increased during November and movement was particularly conspicuous between the 9th and 12th November, during which period 29 out of 41 observations of movement were made. (A few additional reports gave a more general indication of "November" movements without specifying dates). From this it would seem that the populations which had become spectacularly large in many areas undertook obvious unidirectional flights during mid-November. After that period unidirectional flights became less obvious, the populations decreased rapidly and by early December few observers reported large populations.

It is interesting to note that of 10 reports from Queensland 4 are relatively early (September) (none is later than 22nd November); the few other reports of large September populations are for inland localities. Population build-up seems

TABLE I

Locality	No.	Dates	Direction
QUEENSLAND			
East Ayr	*	19.xi.74	N - NE
Banana	*	20.ix.74	
Maryborough		Sep. 74	
Kingaroy	*		
Wynnum		early Nov. 74	SW
Chermside		16.xi.74	
Sth Moonie R. to Miles to Isla Gorge	*	19.ix.74	
Warwick	*	16-22.xi.74	
Milmerran	*	19.ix.74	
Tamborine Mtn	*	mid Nov. 74	S
NEW SOUTH WALES			
Coonabarabran, Pillaga, Moree	*	18.ix.74	
Wallarobba		9-11.xi.74	S
Wagga to Forbes to Dubbo	*	17.ix.74	
Gateshead, Newcastle	*	10.xi.74	N
Dudley, Newcastle	*	11-12.xi.74	N
Edgeworth	*	10.xi.74	NNW
Sodwalls via Hamilton	*	28.xi.74	
Belmont	*	11-12.xi.74	NE
E. Maitland	*		
Paterson to Maitland	*	12.xi.74	ESE
Paterson	*	9.xi.74	SE
Point Stephens–2km N Cabbage Tree Is.	*	9.xi.74	SE
Nulkaba	*	9.xi.74	SE
Abadare	*	9.xi.74	SE
Cessnock	*	9.xi.74	SE
Big Island	*	9.xi.74	SE
Gresford	*	9.xi.74	SE
Singleton	*	9.xi.74	SE
Raymond Terrace	*	11.xi.74	W
Revesby	*	10-12.xi.74	SW
Summerhill		12.xi.74	W
Gymea Bay	*	9-11.xi.74	SW
Lane Cove River (Longueville)		10.xi.74	NW
Ryde	*	8-15.xi.74	S
Narrabeen	*	8-11.xi.74	N
Bayview	*	late Oct. - 9.xi.74	SW
Eastwood		11-12.xi.74	SE
Caringbah			
Sans Souci		Nov. 74	
East Hills		Nov. 74	W
Strathfield		Nov., Dec. 74, Jan. 75	SSW
Wahroonga	*	9.xi-28.xii.74	W & WNW
Ku-ring-gai Chase	*	8.xi.74	
Mt. Colah	*	11.xi-3.xii.74	
Cronulla	*	9-11.xi.74	S
Glenfield		Nov. 74	S & NW

Turramurra to Chatswood	*	10.xi.74	WSW
Clontarf	*	9-17.xi.74	W
Northmead	*	early Nov. 74	W
W. of Jenolan Caves	*	26.xi.74	
Megalong Valley	*		
Wilton	*	10-12.xi.74	N
Primbee		9.xi.74	
Keira	*	19.xii.74	NW
Mt. Keira	*	9.xi.74	
Mt. Keira	*	17.xi.74	
Macquarie Pass		29.xi.74	
Dapto	*	2.xii.74	
Dapto	*	3.xii.74	N
Lyons (A.C.T.)		Nov. 74	
West Wyalong to Hay to Mildura	*	22-23.xi.74	
SOUTH AUSTRALIA			
Torrens Park		20-21.xi.74	
VICTORIA			
Cohuna	*	25.xi.74	S
Tallarook to Albury	*	16.ix.74	
Benalla	*	early Oct.-late Nov. 74	
Bogong Village	*	late Nov. 74	W
Bogong High Plains (1,600m +)		30.xi-1.xii.74	
Falls Creek (1,600m +)		3.xii.74	N
Reservoir	*	Nov. 74	
Reservoir	*	4.xii.74	
Derrimut	*	29.x.74	NE
Melbourne City	*	16-20.xi.74	
Mordialloc		Nov. 74 - Jan. 75	
St. Kilda East	*	18-20.x.74	S
Powelltown area	*	1.xii.74	
Drouin	*	late Oct. 74 - mid Nov. 74	
Clayton	*	late Oct. 74	
Leongatha	*	16-23.xi.74	
Sunshine	*	16-20.xi.74	S & W
Balwyn	*	20.x-16.xi.74	
Footscray	*	4-26.xi.74	N
Eastern Beach		28.xi.74	W
Ballarat	*	1.xii.74	W
Bairnsdale			
Blackburn	*	18.xi.74	
Blairgowrie	*		
Mornington Peninsula	*		
Somers	*	Oct. - Nov. 74	
Mortlake to Warnambool	*		NE
Longwarry North		mid Nov. 74	
Western Port Bay	*		
Nar Nar Goon North	*	10-18.xi.74	W
Portland	*	24.xi.74	

to have occurred in northern and inland areas a little earlier than in southern and coastal areas.

Although large populations were reported for a fairly long period that during which most massed unidirectional flights were recorded was relatively short (first half of November) and these flights took place almost simultaneously over much of eastern Australia with a peak occurrence from about 9th-15th November.

A second remarkable feature of the flights is the variety of their directions. Reports include virtually all directions and simultaneously very different directions were reported for localities quite close to one another (e.g. in some Sydney suburbs such as Ryde and Turramurra the directions were S and WSW respectively for the same period on the same day). It must be concluded from this that the flights involved local populations over relatively short distances or that directional changes of the moving populations were frequent and taking place at more or less fixed points on the route of flight. As the flow of populations past a single point continued for a considerable time it must be concluded that the latter is the more likely explanation for the difference in flight directions at nearby localities. Such flight direction changes are known in other migrant Lepidoptera e.g. *Danaus plexippus* (L.) and some African Pierids.

It can be concluded that *N. amica* is a species in which massed, unidirectional population movements take place under certain circumstances and it seems likely that owing to the complexity of the flight pattern the movements can be detected clearly only in years of exceptional abundance.

Acknowledgements

I would like to thank the many cooperators in the Australian Museum's migration study project, without whose continuing and enthusiastic help data on *Nyctemera amica* could not have been collected, and Mr J. V. Peters for comments on this note.

Reference

Seitz, A., 1890. Algemeine Biologie der Schmetterlinge. I. Theil. *Zool. Jb. Abt. Syst.* 5: 281-343.

A NOTE ON APPARENT OVIPOSITION BEHAVIOUR IN A BOMBYLIID FLY (DIPTERA)

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Despite the abundance and diversity of Bombyliidae in Australia, extraordinarily little is known of their larval biology. The few facts then known were summarised by Roberts (1928a: 92), and a few other records were added in the course of his revision of the family (Roberts 1928a, b; 1929). A very brief summary was given by Colless and McAlpine (1970), to which I can now add records of two undescribed species of *Cyrtomorpha* (held in the Aust. National Insect Collection) reared from grasshopper egg-pods; also, of several larvae, possibly of Bombyliidae, found in tunnels made by Hymenoptera